Name: Date:

Exam: Function Reflections (Solution version 33)

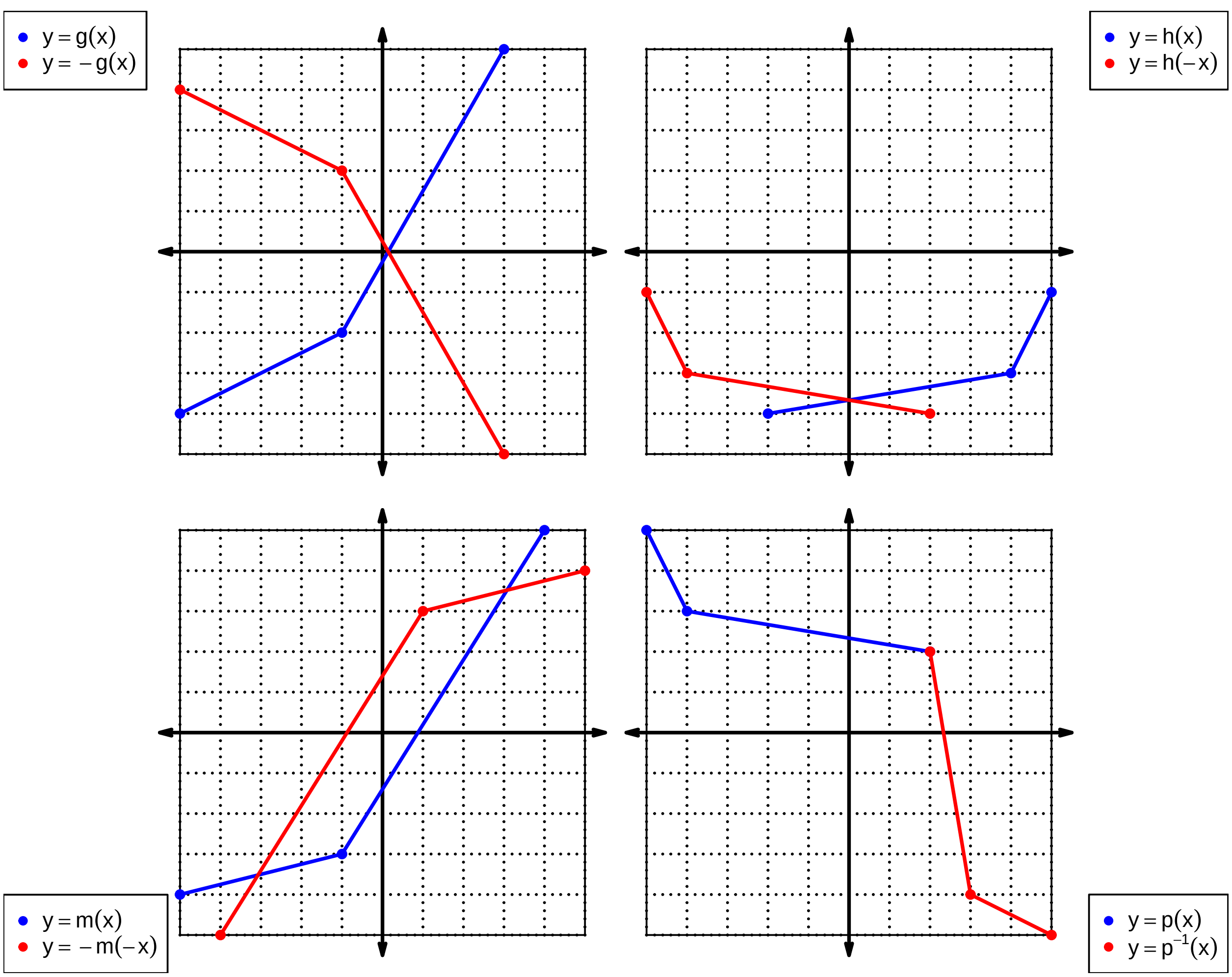
1. Let function f be defined by the polynomial below:

$$f(x) \;=\; -9x^5 - 7x^4 + 5x^3 - 2x^2 - 3x + 6$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$-f(x)$	$9x^5 + 7x^4 - 5x^3 + 2x^2 + 3x - 6$
$-f(-x)$	$-9x^5 + 7x^4 + 5x^3 + 2x^2 - 3x - 6$
$f(-x)$	$9x^5 - 7x^4 - 5x^3 - 2x^2 + 3x + 6$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	6	3	7
2	8	6	3
3	5	4	5
4	2	9	6
5	7	1	2
6	3	7	9
7	9	8	4
8	4	2	1
9	1	5	8

3. Evaluate $g(6)$.

$$g(6) = 7$$

4. Evaluate $f^{-1}(4)$.

$$f^{-1}(4) = 8$$

5. Assuming f is an **even** function, evaluate $f(-5)$.

If function f is even, then

$$f(-5) = 7$$

6. Assuming h is an **odd** function, evaluate $h(-2)$.

If function h is odd, then

$$h(-2) = -3$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) \;=\; x^2 - 1$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$\begin{aligned} p(-x) &= (-x)^2 - 1 \\ p(-x) &= x^2 - 1 \end{aligned}$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$\begin{aligned} -p(-x) &= -\left(x^2 - 1\right) \\ -p(-x) &= -x^2 + 1 \end{aligned}$$

   c. Is polynomial p even, odd, or neither?

   even

   d. Explain how you know the answer to part c.

   We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

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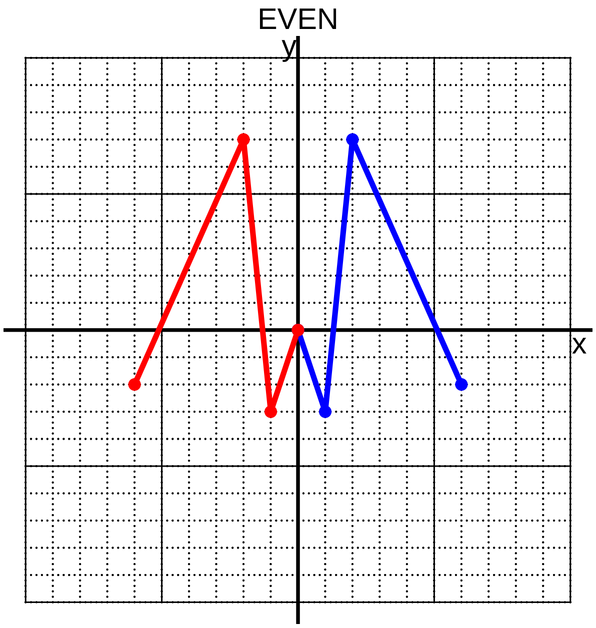
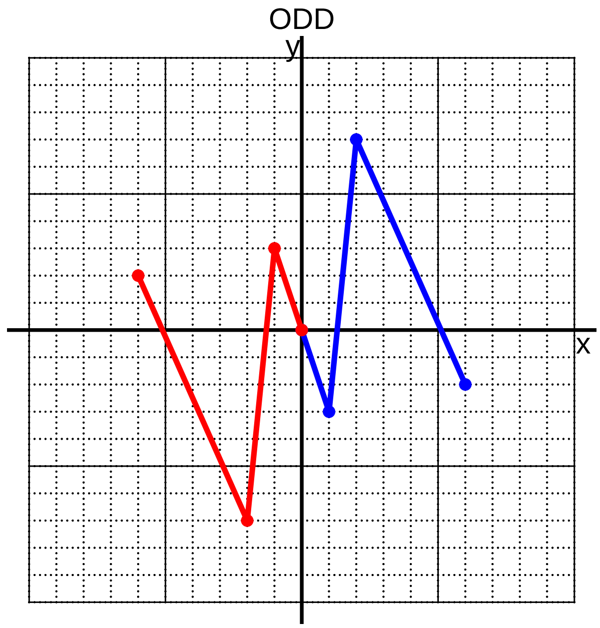
8. I have drawn half of a function. Draw the other half to make it even or odd.





9. Let function f be defined with the equation below.

$$f(x) = \frac{x}{6} + 8$$

a. Evaluate $f(72)$.

step 1: divide by 6
step 2: add 8

$$f(72) = \frac{(72)}{6} + 8$$
$$f(72) = 20$$

b. Evaluate $f^{-1}(17)$.

step 1: subtract 8
step 2: multiply by 6

$$f^{-1}(x) = 6(x - 8)$$
$$f^{-1}(17) = 6((17) - 8)$$
$$f^{-1}(17) = 54$$

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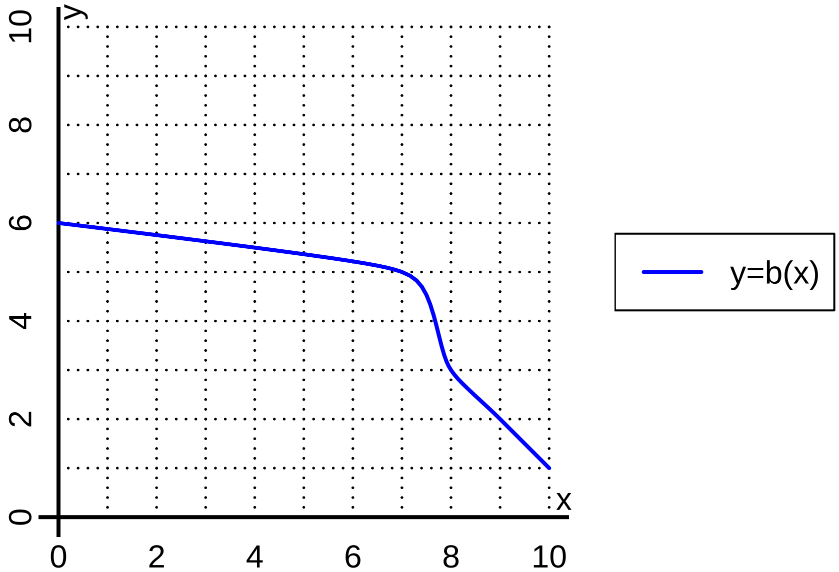
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(9)$.

$$b(9) \;=\; 2$$

b. Evaluate $b^{-1}(3)$.

$$b^{-1}(3) \;=\; 8$$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-5	5	5	-5
-1	-6	6	-6	6
0	0	0	0	0
1	-6	6	-6	6
2	5	-5	-5	5

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.